IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Examiner: Jeanette E. Chapman

Group Art Unit: 3635

In re application of:

PAOLO TIRAMANI

Serial No.: 10/653,523

Filed: September 2, 2003

MODULAR PREFABRICATED HOUSE

Attorney Docket No. 286357-00004-1

AFFIDAVIT OF ROBERT DELORENZO

Commissioner for Patents
MAIL STOP AF
P.O. BOX 1450
Alexandria, VA 22313-1450

Dear Sir:

Robert Delorenzo hereby declares and states as follows:

1. I am a builder and a contractor with over 20 years of experience in the field of home construction. I have built, or been involved with the building of over 200 homes and/or other buildings. I have owned and operated my own construction business, Delorenzo Construction Corporation for over 15 years.

2. Those skilled in the art of construction, especially in the construction of frames made from wood, identify vertical members of a frame assembly, typically by one of two names; a "post" or a "stud."

3. In a typical frame assembly, a "post" is a load-bearing vertical member, typically located at corner of a wall. Two posts may support a "beam" which is a horizontal load-bearing member. On walls having an extended length, additional posts may be used. The additional posts are, typically, spaced more than two feet apart from a corner post. Posts typically have a greater cross sectional area than a stud.

4. A "stud" is a reduced load-bearing vertical member. Because a studs is a reduced load-bearing member, a stud must be located, typically, less than two feet apart. Studs are typically made from a plurality of wooden 2"-by-4"s. If the studs have an actual cross-sectional area of 2"x 4", that is a non-dressed 2"-by-4", the studs are normally spaced 24" apart. If the 2"-by-4" have been dressed, that is, surfaced with a planing machine, the 2"-by-4" actually has dimensions closer to 1.5" by 3.5". Dressed studs are typically spaced 16" apart. Studs forming a wall typically include a top plate and a bottom plate. That is, a 2"-by-4" extending over the top of, or underneath, the studs.

5. I have reviewed U.S. Patent No. 6,959,515 disclosing a modular building structure. The patent states that a room module includes a steel chassis defining a "cuboid volume." This means that the chassis has four vertical members, one located in each corner of the module. The patent further states that "cross bracing" by diagonal members is optional. Because the vertical members of the chassis are load-bearing members, the vertical members would be identified as "posts" by those skilled in the art. Further, because the patent does not disclose additional vertical supports, whether load-bearing or not, between the corner posts, this patent fails to disclose any "studs" as that word is understood in the art.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

10.3.06
Dated

Robert Delorenzo

Exhibit B

Excerpted from *Precision Framing*

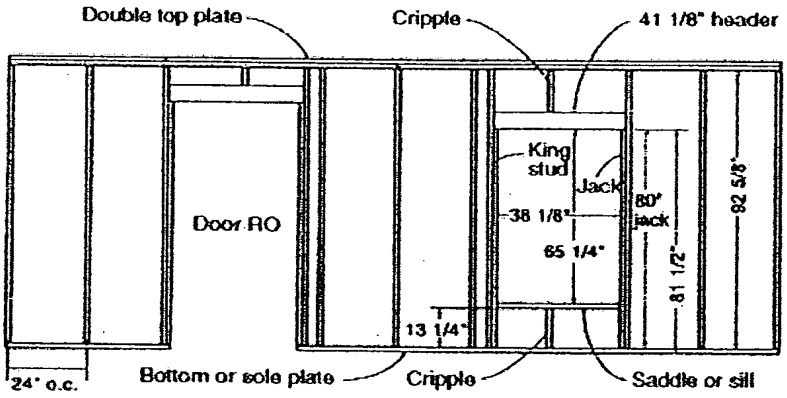
Anatomy of a Stud-Framed Wall

Proper framing for bearing and nonbearing walls

by Michael Guertin and Rick Arnold

Wall plates

A wall is a collection of studs (usually sized 2x4 or 2x6) equally spaced (usually 16 in. or 24 in. on center) and sandwiched between top and bottom plates. The top plate can be either single or double. Double plating is most common on load-bearing walls unless the roof rafters or trusses and floor joists stack directly over the studs in the wall, then a single top plate can be used.



Load-bearing wall

Headers

Large openings in the wall are made for windows and doors. When the opening is greater in width than the stud spacing -- and most windows are wider than 24 in. -- then a header must be inserted to carry the load of the interrupted stud(s). A header is a simple beam sized to support the load above the opening it spans.

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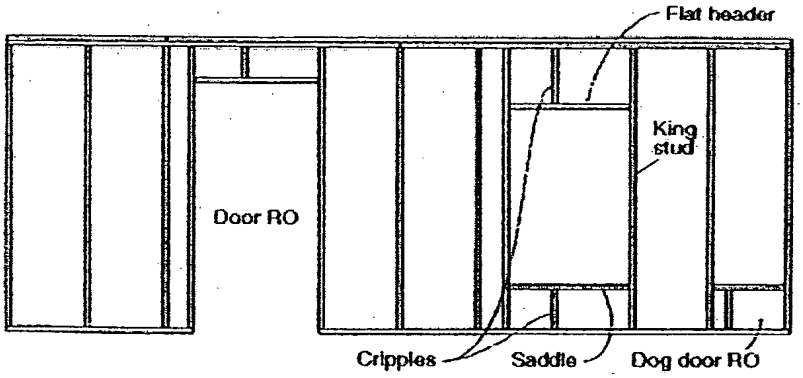
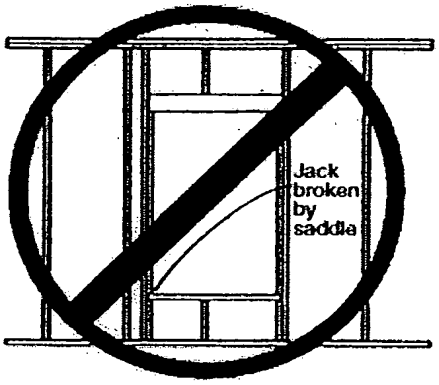


Nonbearing wall

Jack studs and king studs

The header is supported by a jack stud at each end. Jacks, sometimes called trimmers, fit under each end of a header, and they transfer the load that the header carries down to the bottom plate and the framing beneath. Nailed to the jacks are full-height studs called king studs; they support the assembly between the plates. Sometimes jacks must be doubled on wide openings so there's enough supporting surface for the header to bear on. Jacks can be replaced with a steel header hanger attached to the king stud.



Avoid this practice.

Saddles and cripples

A saddle (also called a sill) forms the bottom of a window opening. It's a piece of 2x stock laid flat and nailed between the jacks. Cripples are short pieces of 2x stock that run underneath the saddle. And, depending on a header's height, cripples can run from the header to the plate. Cripples are located at the points where a common stud would have been located had it not been interrupted by the opening.

Mike Guertin and Rick Arnold are professional builders in Rhode Island with 20 years' experience building custom homes. In addition to being contributing editors for *Fine Homebulding* magazine, they have written numerous articles on homebuilding, and they conduct regular seminars for builders.

From *Precision Framing*, pp. 100-101
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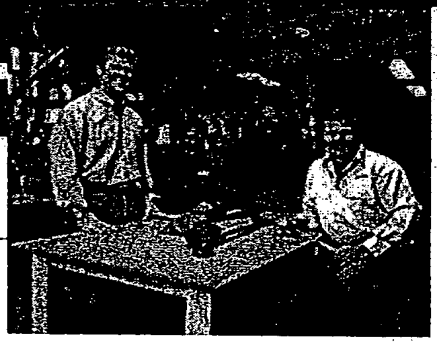
Exhibit C



Stud Spacing

Building interior walls

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Q: My house was built in 1950, and its exterior walls are made of cement block. When I removed some interior walls while renovating the bedroom, I noticed that the studs were spaced 24 inches on center. When I install new walls, should I keep that spacing? I plan to cover them with drywall.

— Brad, East Peoria, IL

A: Tom Silva replies: Codes generally allow 24-inch on-center spacing for studs in interior nonbearing walls, and under certain circumstances even for load-bearing walls. But I don't see why you'd want do it, even if you can. You don't save much money in materials or much time in installation, and the finished wall is likely to flex if you lean on it. I build interior walls with 2x4 studs spaced 16 inches on center and cover them with at least ½-inch-thick drywall. They're stiffer and more solid-feeling than anything built with 24-inch spacing.

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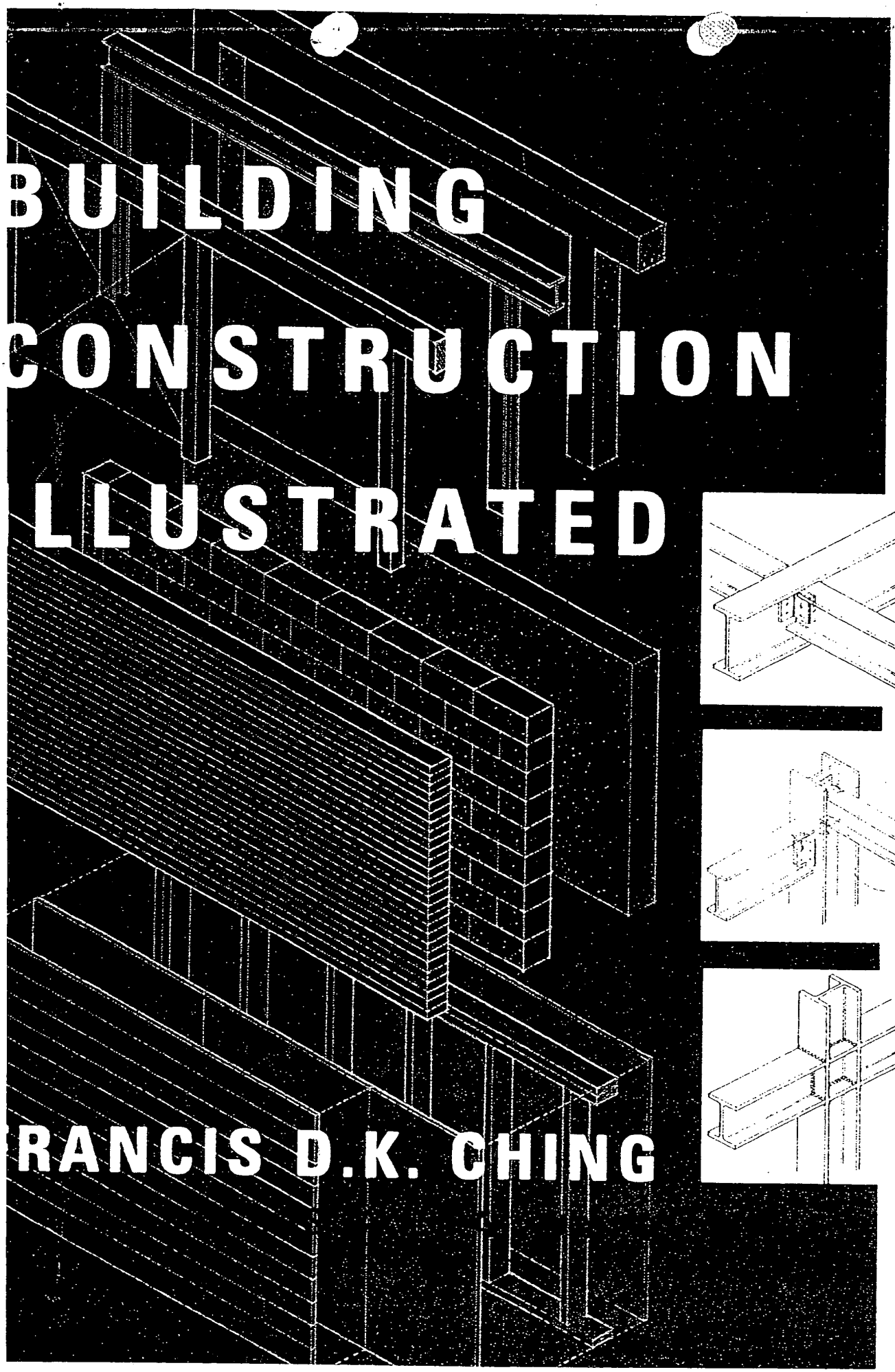
Exhibit D

BUILDING CONSTRUCTION ILLUSTRATED



FRANCIS D.K. CHING

THIRD EDITION

ıctural Frames

Concrete frames are typically rigid frames and qualify as noncombustible, fire-resistive construction.
Noncombustible steel frames may utilize moment connections and require fireproofing to qualify as fire-resistive construction.
Timber frames require diagonal bracing or shear planes for lateral stability and may qualify as heavy timber construction if used with noncombustible, fire-resistive exterior walls and if the members meet the minimum size requirements specified in the building code.
Steel and concrete frames are able to span greater distances and carry heavier loads than timber structures.
Structural frames can support and accept a variety of nonbearing or curtain wall systems.
The detailing of connections is critical for structural and visual reasons when the frame is left exposed.

ıncrete and Masonry Bearing Walls

Concrete and masonry walls qualify as noncombustible construction and rely on their mass for their load-carrying capability.
While strong in compression, concrete and masonry require reinforcing to handle tensile stresses.
Height-to-width ratio, provisions for lateral stability, and proper placement of expansion joints are critical factors in wall design and construction.
Wall surfaces may be left exposed.

letal and Wood Stud Walls

Studs of cold-formed metal or wood are normally spaced @ 16" or 24" (406 or 610) o.c.; this spacing is related to the width and length of common sheathing materials.
Studs carry vertical loads while sheathing or diagonal bracing stiffens the plane of the wall.
Cavities in the wall frame can accommodate thermal insulation, vapor retarders, and mechanical distribution and outlets of mechanical and electrical services.

- Stud framing can accept a variety of interior and exterior wall finishes; some finishes require a nail-base sheathing.
- The finish materials determine the fire-resistance rating of the wall assembly.
- Stud wall frames may be assembled on site or panelized off site.
- Stud walls are flexible in form due to the workability of relatively small pieces and the various means of fastening available.

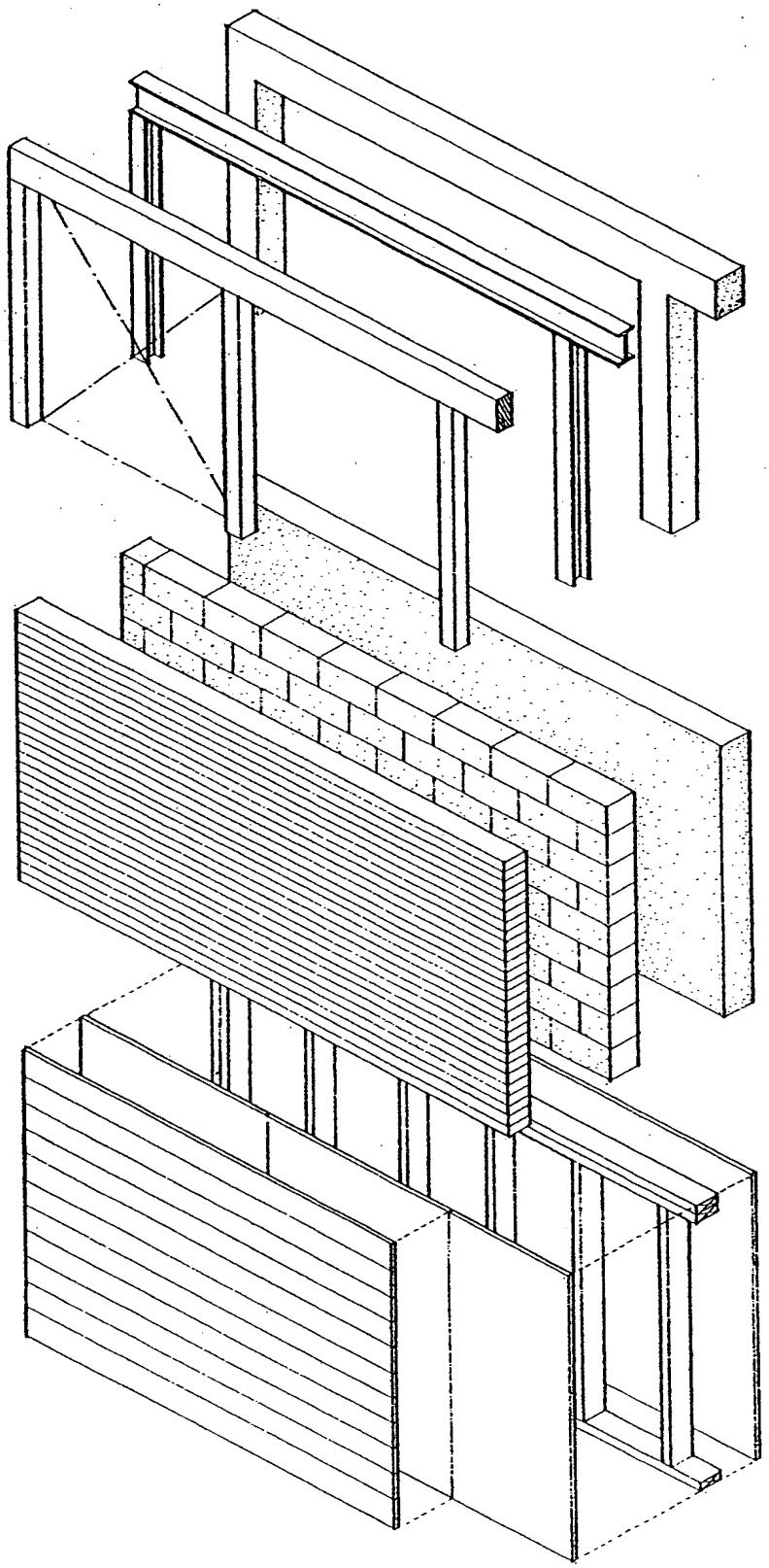


Exhibit E

FOURTEENTH EDITION

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)5.5 **Nonloadbearing walls:** Studs in nonloadbearing walls l partitions shall not be spaced more than 48 inches (1219 mm) ., and are permitted to be erected with the long dimension allel to the wall, unless otherwise approved as an integrated embly by testing. A single top plate shall be prohibited except ere such plate is installed in accordance with Section)5.4.2.

2305.5.1 **Notching and boring:** Notches in studs shall not exceed 40 percent of the stud depth. Bored holes shall not exceed 60 percent of the stud depth and shall not be closer than $^5/_8$ inches (15 mm) to the edge. Notches and holes shall not occur in the same cross-section.

)5.6 **Support and anchorage:** Support and anchorage of mbers on girders, walls and beams shall conform to Sections)5.6.1 through 2305.6.3.

2305.6.1 **Support and anchorage on girders:** All members framing into girders shall be anchored or tied to secure continuity. The ends of all wood beams that rest on girders shall bear not less than 4 inches (102 mm) or shall be supported in approved metal stirrups, hangers or on wood clips or ribbon strips. Beams framing from opposite sides shall either lap at least 6 inches (152 mm) and be bolted or spiked together or, where framed end-to-end, the beams shall be secured together by approved ties, straps, dogs, plates or sheathing.

2305.6.2 **Support and anchorage on walls or beams:** Except where supported on a 1 × 4 ribbon strip and nailed to the adjoining stud, joists shall bear on walls or beams of wood or steel not less than $1^1/_2$ inches (38 mm) or shall be supported by metal stirrups, hangers or a nominal 2-inch wood ledger strip. The minimum concrete or masonry support shall be 3 nches (76 mm). Joists framing over beams from opposite sides shall either lap at least 3 inches (76 mm) and be securely fastened together or, where framed end-to-end, the joists shall be secured together by approved ties, straps, dogs, plates or sheathing.

2305.6.3 **Girder supports:** Wall plate boxes of the self-releasing type, or approved hangers, shall be provided where beams and girders are supported by concrete or masonry. An air space of $^1/_2$ inch (13 mm) shall be provided at the top, end and sides of the member unless approved naturally durable or *preservative-treated* wood in accordance with Section 2311.0 s installed. Wood beams and girders supported by walls required to have a fireresistance rating of 2 hours or more shall have not less than 4 inches (102 mm) of solid concrete or solid masonry between their ends and the outside face of the wall and between adjacent beams.

5.7 **Wind bracing:** Structural members and connections that st wind pressures shall be designed for the wind loads as uired by Section 1609.0.

2305.7.1 **Sheathing:** Bracing sheathing shall be applied with ill edges supported.

2305.7.2 **Design:** Members or connections shall be permitted o be designed in accordance with Section 2303.1.3 for wind peeds shown in Figure 1609.3.

5.8 **Seismic bracing:** Where structural analysis of the seisforce-resisting system is not provided, buildings shall meet the provisions of this section and shall have roof and exterior wall *dead loads* less than or equal to 15 psf (718 Pa) and floor *dead loads* less than or equal to 10 psf (479 Pa).

Exceptions

1. Detached *one-* and *two-family dwellings* located in seismic map areas having an effective peak velocity-related acceleration (A_v) value less than 0.15.
2. The exterior wall weight limitation shall not apply to masonry veneer attached to one-story Seismic Performance Category B buildings.

2305.8.1 **Wall bracing required:** All exterior walls and required interior-braced walls shall be braced by one of the types of sheathing prescribed in Table 2305.8.1 for each 25 lineal feet (7620 mm) of exterior wall or required interior-braced wall line. The required length of sheathing shall be distributed along the length of the braced wall with sheathing placed at each end of the exterior wall or interior-braced wall. A minimum 4-foot (1219 mm) length of sheathing shall be located at the end of each braced wall. The construction of braced walls shall comply with the requirements of Section 2305.9.

2305.8.2 **Double-sheathed walls:** Where braced walls are sheathed on both sides with identical sheathing, the required length of sheathing in Table 2305.8.1 is permitted to be taken as one-half the tabular length. Where different sheathing materials are used on either side of a wall, the required length of sheathing in Table 2305.8.1 is permitted to be taken as one-half of the tabular length for the material requiring the greater length. Double-sheathed walls shall have a minimum length of 4 feet (1219 mm).

Table 2305.8
WALL SPACING AND HEIGHT LIMITATIONS FOR WOOD FRAME CONSTRUCTION

Seismic Performance Category	Maximum distance between interior-braced walls (feet)[c]	Maximum stories (height) permitted[c]
A	See Section 1610.1, Exception #3	
B	35	3 (40 feet)
C	25	2 (30 feet)
D[a]	25	1 (20 feet)[b]
E	Engineering analysis required, see Section 2306.0	

Note a. Applies only to Seismic Hazard Exposure Group I; engineering analysis required for Seismic Hazard Exposure Group II.
Note b. Detached one- and two-family dwellings shall not exceed two stories or 30 feet in height.
Note c. 1 foot = 304.8 mm.

2305.8.3 **Stud walls:** Stud walls that are less than the full height of the story shall be braced as required for exterior walls or interior-braced walls and shall be considered an additional story.

2305.8.4 **Sheathing installation:** Sheathing shall be installed in accordance with the provisions of Table 2305.13 where acting as wall bracing. To be considered effective as bracing,